

CLAIMS

1. A method of selectively depositing a material on a substrate including a contoured surface including a protrusion and a recess, the method comprising:
 - 5 applying a first fluid to the contoured surface of the substrate;
 - allowing the first fluid to distribute across a portion of the contoured surface such that the first fluid contacts the protrusion and not the recess; and
 - allowing a first material to deposit on the substrate where the substrate is in contact with the first fluid.
- 10 2. The method of claim 1, further comprising:
 - applying a second fluid to the contoured surface of the substrate;
 - allowing the second fluid to distribute across a portion of the contoured surface such that the second fluid contacts the recess; and
 - allowing a second material to deposit on the substrate where the substrate is in contact with the second fluid.
- 15 3. The method of claim 2, further comprising:
 - applying a third fluid to the contoured surface of the substrate;
 - allowing the third fluid to distribute across a portion of the contoured surface; and
 - 20 allowing a third material with an affinity for one of the first material and the second material to deposit on the substrate only where the one of the first material and the second material is deposited.
4. The method of claim 3, wherein the first material is a protein.
- 25 5. The method of claim 4, wherein the second material is a protein.
6. The method of claim 5, wherein the first material is cytophobic.
- 30 7. The method of claim 6, wherein the second material is cytophilic.
8. The method of claim 7, wherein the third material is a cell.

9. The method of claim 1, wherein the recess comprises a microwell.

10. The method of claim 9, wherein the microwell is less than 1 millimeter in width and depth.

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11. The method of claim 10, wherein the microwell is less than 100 micrometers in width and depth.

12. The method of claim 11, wherein the microwell is less than 50 micrometers in width
10 and depth.

13. The method of claim 1, wherein the protrusion comprises a microprotrusion.

14. The method of claim 13, wherein the microprotrusion is less than 1 millimeter in
15 width and height.

15. The method of claim 14, wherein the microprotrusion is less than 100 micrometers in width and height.

20 16. The method of claim 15, wherein the microprotrusion is less than 50 micrometers in width and height.

17. The method of claim 1, wherein the substrate comprises a flexible material.

25 18. The method of claim 1, wherein the substrate comprises a polymer.

19. The method of claim 18, wherein the substrate comprises polydimethylsiloxane.

20. The method of claim 1, wherein the recess comprises a plurality of recesses.

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21. The method of claim 20, wherein the protrusion comprises a portion of the substrate between the recesses.

22. The method of claim 1, wherein the protrusion comprises a plurality of protrusions.

23. The method of claim 22, wherein the recess comprises a portion of the substrate between the protrusions.

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24. The method of claim 1, wherein the first fluid has an advancing angle of greater than about 90°.

10 25. The method of claim 1, wherein at least one of the second fluid and the third fluid has an advancing angle of less than about 90°.

26. A method, comprising:

selectively depositing a protein on an outward-facing portion of a protrusion of a contoured surface including a protrusion and a recess, at least on of the protrusion and recess having a maximum lateral dimension of no more than about 1 mm, while leaving the recess free of the protein.

27. A method of selectively depositing a material on a substrate having a contoured surface including a protrusion and a recess, the method comprising:

20 applying a fluid to the contoured surface without urging the fluid against the surface mechanically, and allowing the fluid to contact the protrusion and not the recess; and
allowing a first material to be deposited from the fluid onto the protrusion but not the recess.

25 28. A cell containment device, comprising:

a substrate including a contoured surface including a protrusion and a recess;
a cytophobic material connected to the protrusion; and
a cyophilic material connected to the recess.

30 29. The cell containment device of claim 28, wherein the substrate comprises a flexible material.

30. The cell containment device of claim 28, wherein the substrate comprises a polymer.

31. The cell containment device of claim 30, wherein the substrate comprises polydimethylsiloxane.

5 32. The cell containment device of claim 28, wherein the recess comprises a plurality of recesses.

33. The cell containment device of claim 32, wherein the protrusion comprises a portion of the substrate between the recesses.

10 34. The cell containment device of claim 28, wherein the protrusion comprises a plurality of protrusions.

35. The cell containment device of claim 34, wherein the recess comprises a portion of the substrate between the protrusions.

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36. An article, comprising:

a contoured surface including at least one protrusion and at least one recess, and a cytophilic agent on the surface within the recess, the surface at the protrusion being free of the cytophilic agent.

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37. The article of claim 36, further comprising a cytophobic agent on the surface at the protrusion.

38. An article, comprising:

25 a contoured surface including a plurality of protrusions and recesses, and at least one cell in at least one recess, wherein the at least one recess has a maximum lateral dimension of 500 μ m.

39. An article, comprising:

30 a contoured surface including a plurality of protrusions and recesses, and a single cell in at least one recess.